

# **EPA WORLD TRADE CENTER EXPERT TECHNICAL REVIEW PANEL**

## **Comprehensive Indoor Sampling for the Potential Presence**

### **Of 9/11-related Contaminants in Lower Manhattan**

#### **comments of**

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EPA noted one year ago that “extensive systematic sampling of indoor air and settled dust in Lower Manhattan residences had not occurred at the time the draft Contaminants of Potential Concern (COPC) document was released.”<sup>2</sup> Arguably, extensive systematic sampling of indoor residential spaces has yet to occur. Nor has there been adequate investigation of potential 9/11-related contamination of indoor commercial and public spaces. As a result, our knowledge of the composition, concentration, and dispersion of 9/11-related contaminants remains limited, as does our ability to evaluate unmet public health needs.

The initial April 12 discussion of designing a comprehensive and representative testing program of indoor spaces in Lower Manhattan is a welcome and appropriate development. The following preliminary thoughts on a comprehensive test program draw in part on the comments and recommendations of the two peer-review panels which previously examined 9/11-related EPA documents.<sup>3,4</sup> Although these peer review documents were not included in list of background documents for review by this current

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<sup>1</sup> New York Committee for Occupational Safety and Health (NYCOSH).

<sup>2</sup> Contaminants of Potential Concern Committee, World Trade Center Indoor Air Task Force Working Group. World Trade Center Indoor Environmental Assessment: Response to Peer Review Comments on the Report for Selecting Contaminants of Potential Concern and Setting Health-Based Benchmarks. May 2003, [http://www.epa.gov/wtc/response\\_peer\\_review.pdf](http://www.epa.gov/wtc/response_peer_review.pdf).

<sup>3</sup> Toxicology Excellence for Risk Assessment (TERA). World Trade Center October 21-22, 2002 Peer Review Meeting Notes, prepared for U.S. Environmental Protection Agency. Cincinnati OH, February 7, 2003, <http://www.tera.org/peer/WTC/WTC%20Peer%20Review%20Meeting%20Notes.pdf>.

<sup>4</sup> National Center for Environmental Assessment, U.S. Environmental Protection Agency. Summary Report of the U.S. EPA Technical Peer Review Meeting on the Draft Document Entitled: Exposure and Human Health Evaluation of Airborne Pollution from the World Trade Center Disaster. EPA/600/R-03/142, December 2003, [http://www.epa.gov/wtc/panel/peer\\_review\\_report.pdf](http://www.epa.gov/wtc/panel/peer_review_report.pdf).

World Trade Center Expert Technical Review Panel, many of the issues raised earlier by peer reviewers remain pertinent to the discussion at hand.

## 1. Context

Sampling program design, evaluation of data, and setting of health-based benchmarks should be informed by contaminant sources and exposure populations.

Primary sources include the dust cloud produced by the collapse and combustion byproducts dispersed in the plume.

Secondary sources include the paths and locations of the debris removal and waste transfer operations and the infiltration, settling out, and resuspension of WTC contaminants in indoor spaces.

Distinct exposure populations include:

- persons caught in the dust cloud on 9/11
- workers and volunteers at Ground Zero and the associated debris removal and waste transfer operations
- workers engaged in regular cleanup of WTC dust and debris in Lower Manhattan commercial and residential spaces outside of Ground Zero
- workers engaged in the restoration of essential services in Lower Manhattan, such as telecommunications, electrical, water, sanitation, transit, etc.
- residents, workers, and students in Lower Manhattan subject to exposure from secondary sources.

## 2. Definition of goals and limitations

The goals and limitations of the sampling program must be clearly defined. In particular, appropriate end use of data and limitations on end use must be unambiguous.

The basic goal of a comprehensive indoor testing program should be to determine what, if any, 9/11-related contamination remains at this point in time. The presence or absence of contaminants at this late date should not be used to extrapolate backwards in time to draw conclusions about the presence or absence of contaminants at an earlier date.

As in the risk assessment process used at Superfund sites, the extent and nature of contamination, if any, should be determined prior to and separately from the establishment of health-based exposure or cleaning benchmarks.

## 3. Expanded geographic scope

Previously designated geographic boundaries for testing and cleanup (i.e, Manhattan south of Canal and Pike Streets) were not scientifically determined. Consequently, the

extent of 9/11-related contaminants, if any, that were dispersed north of Canal Street, in Brooklyn, or in New Jersey, remains unknown.

A goal of any new indoor testing effort should be to sample geographic areas impacted by WTC dust to determine the current boundary of WTC contamination (i.e., results equal background or are below detection limits). The sampling plan should use Ground Zero as a central point and plot collection of indoor samples for distance and direction radiating outward in concentric circles, as suggested by EPA's Office of the Inspector General.<sup>5</sup> Samples should be taken at different elevations above street level. Habitable spaces selected for sampling should be served by a mechanical ventilation system or should have doors or windows that face in the direction of Ground Zero. Special attention should be paid to communities underserved by prior testing and cleanup efforts, such as Chinatown. Locations where prior independent test results indicated elevated levels of contaminants should be targeted for inclusion in the test program. Inclusion of affected parties in the planning, design, and implementation of a testing program of this nature is essential.

There was no regulatory or scientific basis for the exclusion of Lower Manhattan schools and workplaces from the prior testing program. Any new testing program should include residential spaces and public sector and private sector workplaces, including schools and firehouses. Emphasis should be placed on sampling mechanical ventilation systems as well as habitable spaces.

#### 4. Expanded suite of potential contaminants

Very little of the available 9/11 data is based on indoor sampling. It is likely that the program under consideration will constitute the final opportunity to evaluate the content, concentration, and extent of 9/11-related indoor contamination. At a minimum, an indoor environmental sampling program should investigate the six substances identified by the inter-agency task force as contaminants of potential concern - asbestos, dioxins, lead, PAHs, fibrous glass, and crystalline silica. It would be difficult to justify to the impacted communities any testing program that fails to address the target substances identified by EPA and other agencies.

There has been some discussion among panelists as to whether it is necessary to test for all six COPCs. In particular, with regard to lead it has been noted the higher number of "exceedences" for lead when compared to results for other substances in EPA indoor tests may be confounded by the presence of lead-based paint in residences. This point is credible but not persuasive, as EPA has no data to correlate lead exceedences with presence or absence of lead-based paint or age of building. To begin to account for this

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<sup>5</sup> Office of the Inspector General, U.S. Environmental Protection Agency. Evaluation Report - EPA's Response to the World Trade Center Collapse: Challenges, Successes, and Areas for Improvement. Report No. 2003-P-00012, August 21, 2003, [http://www.epa.gov/oig/reports/2003/WTC\\_report\\_20030821.pdf](http://www.epa.gov/oig/reports/2003/WTC_report_20030821.pdf)

possible confounder, any new test program should provide for XRF screening of painted surfaces in conjunction with testing for lead content of dust.

Given the paucity of indoor data, it may be appropriate to consider the inclusion of additional substances in sampling efforts. For example, I know of only two studies of mercury in post-9/11 Lower Manhattan. An independent industrial hygienist found elevated levels in some residences, while an EPA study did not. However, both studies examined only vapor phase mercury. I have not seen any data pertaining to mercury compounds such as oxides or chlorides adsorbed onto particulate matter. The presence of heavy metals such as lead and possibly mercury suggest that additional metals such as cadmium and chromium may be present. The presence of PAHs and dioxins suggest the possible presence of related compounds. In so far as possible, testing for a range of contaminants should be inclusive rather than exclusive.

## 5. Sampling methodologies

EPA has argued in prior 9/11 test efforts that sampling results must be gauged against health-based benchmarks, thereby limiting opportunities to use additional professional sampling methodologies that could provide useful information as to the presence or absence of contaminants and their evaluation against professional, as distinct from health-based, standards. The agency itself, however, has at times used other sampling methodologies, as in its World Trade Center Residential Confirmation Cleaning Study. If the new sampling program maintains separation between measurement of (pre-cleaning) contaminant levels and establishment of health-based benchmarks, then a wider array of sampling methods, such as wipes and microvac, would become available, greatly easing the collection of data and making it less intrusive for occupants of spaces being sampled.

Furthermore, there are limitations to air sampling. Air sampling for asbestos has been known to measure low levels in air at times when surface load measurements are high. While the science is uncertain as to the relationship between surface load and potential for resuspension and subsequent inhalation, asbestos regulatory requirements utilize bulk samples for initial determination of contamination or potential for contamination and air samples for post-cleaning clearance testing. Since a new testing program would be aimed at determining pre-cleaning levels of contamination rather than evaluating post-cleaning clearance tests, sampling of settled dust is appropriate. As settled dust is a critical pathway for exposure via ingestion and also through resuspension, we should consider sampling both settled and suspended particulates.

## 6. Reservoirs

Although it is well documented that soft or porous surfaces such as carpets and upholstery may become sinks or reservoirs for particulate contaminants, including fibers, release or retention rates for trapped particulates are not well understood. It has not been confirmed that so-called “modified aggressive” or even aggressive methods for

air sampling provoke release of trapped fibers from porous materials. It is known that trapped fibers can be released by other forms of disturbance such as vacuuming. Significantly, the aggressive method of air sampling required by asbestos regulations does not take into account the issue of porous reservoirs because source removal of such materials is presumed to be a normal part of asbestos abatement, i.e., such materials are deemed to be unrecoverable due to the potential for future fiber release.

Because there is no known way to effectively clean asbestos contaminated carpets,<sup>6</sup> and because it is anecdotally reported that most residents and businesses did not replace carpets or upholstered furniture, microvac sampling methods for porous materials should be a component of any new testing program. However, criteria used to evaluate contaminant load on hard surfaces are not directly applicable to soft surfaces. Additional, separate criteria for evaluating soft surface loads will have to be developed.

7. Use of one substance as a surrogate for the presence of others

Weisel<sup>7</sup> argues persuasively that several criteria must be met before a contaminant substance can be used as a surrogate for the possible presence of other contaminants: it must be a component of all dispersed materials; it must not become separated from other substances during dispersion; the ratio of the proposed surrogate to other contaminants must be consistent; and remediation must be as effective for all contaminants as it is for the surrogate.

Neither any nor all of these criteria has been demonstrated to apply to any single WTC-derived substance.

8. Particle size and settled dust

Settled dust tends to contain a higher proportion of large particulates than was present in the original suspended dust. The smaller particles, which are likely to be under-represented, are nevertheless significant because they have proportionately greater surface area and therefore greater potential to have adsorbed contaminants on their surfaces. If small particles are under-represented in sampling results, then contaminants which have adsorbed onto their surfaces may be missed.

I would appreciate hearing from other panelists on this issue.

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<sup>6</sup> U.S. Environmental Protection Agency. WTC Residential Dust Cleanup Program: Carpets, Upholstered Furniture and Other Fabric Surfaces Fact Sheet.  
<http://www.epa.gov/wtc/factsheets/fabrics.html>.

<sup>7</sup> Weisel, Clifford. Scientific Input on Issues Related to EPA's Response Activities to the Attacks on the World Trade Center. Task Order #59, EPA Contract 68-C-02-060,  
<http://www.epa.gov/wtc/panel/pdfs/weisel.pdf>.